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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MARGER JOHNSON & MCCOLLOM PC
1030 SW MORRISON STREET
PORTLAND, OR 97205

EXAMINER

RAO, ANAND SHASHIKANT

ART UNIT PAPER NUMBER

2613

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/912,799

Applicant(s)

LI, XIN

Examiner

Andy S. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Multi-resolution backward video coding," (Beckman Institute for Advanced Science and Technology, Urbana, Illinois), 0-8186-7310-9/95 1995 IEEE by Aria Nostratinia et al., (hereinafter referred to as "Nostratinia") in view of Chen et al., (hereinafter referred to as "Chen").

Nostratinia discloses a method of compressing video signals (Nostratinia: page 564, section 2, lines 3-10), comprising: transforming both a current frame and a reference frame using a wavelet transform having multiple levels (Nostratinia: page 565, figure 2, step 1); performing motion compensation to low frequency band at a lowest level of the transformed image data producing motion compensated, transformed image data (Nostratinia: page 565, figure 2, step 2); performing motion compensation of high frequency bands at the lowest level of the transformed image (Nostratinia: page 565, figure 2, steps 3 (a) and 3 (b)); applying one-level inverse

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transform to the reference frame to produce a reconstructed image at the next resolution level (Nostratinia: column Nostratinia: page 565, figure 2, step 3 (c)); setting the next resolution level as the lowest level (Nostratinia: page 565, figure 2, step 3 (d)); repeating the above process until the process reaches the highest resolution level (Nostratinia: page 565, figure 2, step 3 (e)), as in claim 1. However Nostratinia fails to disclose applying band or phase shifting methods to obtain an overcomplete expansion of the reference frame. Chen discloses that for a video coding method, it is known to use apply band or phase shifting methods (Chen: column 10, lines 60-67; column 11, lines 1-23) in said method in order to reduce excessive requantization error in the recompressed data (Chen: column 8, lines 45-53) which would occur in Nostratinia's disclosure of using recursive quantization (Nostratinia: page 564, section 3, lines 20-29). Accordingly, given this teaching it would have been obvious for one of ordinary skill in the art to incorporate the Chen teaching of applying band or phase shifting methods into the Nostratinia method in order to reduce excessive requantization error in the primary reference's recursive quantization. The Nostratinia method, now incorporating Chen's application of band or phase shifting methods, has all of the features of claim 1.

Regarding claim 2, the Nostratinia method, now incorporating Chen's application of band or phase shifting methods, has the multiple levels equal to 2 (Nostratinia: page 565, figure 1), as in the claim.

Regarding claims 3 and 7, the Nostratinia method, now incorporating Chen's application of band or phase shifting methods, provides resolution scalability (Nostratinia: page 564, section 2, lines 1-10), as in the claims.

Regarding claims 4 and 8, the Nostratinia method, now incorporating Chen's application of band or phase shifting methods, has providing rate scalability by performing motion estimation to a multi-resolution representation of video signals (Nostratinia: page 564, section 3, lines 10-20), as in the claims.

Regarding claims 5 and 9, the Nostratinia method, now incorporating Chen's application of band or phase shifting methods, further comprises hierarchical motion estimation (Nostratinia: page 564, section 2, lines 17-27), as in the claims.

Regarding claims 6, 10-11, the Nostratinia method, now incorporating Chen's application of band or phase shifting methods, discloses restoring accuracy of a motion field (Nostratinia: page 564, section 2, lines 50-60), as in the claims.

Nostratinia discloses a method of compressing video signals (Nostratinia: page 564, section 2, lines 3-10), comprising: transforming both a current frame and a reference frame using a wavelet transform having multiple levels (Nostratinia: page 565, figure 2, step 1); performing motion compensation to low frequency band at a lowest level of the transformed image data producing motion compensated, transformed image data (Nostratinia: page 565, figure 2, step 2); performing motion compensation of high frequency bands at the lowest level of the transformed image (Nostratinia: page 565, figure 2, steps 3 (a) and 3 (b)); applying one-level inverse transform to the reference frame to produce a reconstructed image at the next resolution level (Nostratinia: column Nostratinia: page 565, figure 2, step 3 (c)); setting the next resolution level as the lowest level (Nostratinia: page 565, figure 2, step 3 (d)); repeating the above process until the process reaches the highest resolution level (Nostratinia: page 565, figure 2, step 3 (e)), as in claim 12. However Nostratinia fails to disclose applying band or phase shifting methods to

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obtain an overcomplete expansion of the reference frame wherein said method is implemented on a computer readable medium including software code. Chen discloses that for a video coding method, it is known to use apply band or phase shifting methods (Chen: column 10, lines 60-67; column 11, lines 1-23) in said method wherein said method is implemented on a computer readable medium including software code (Chen: column 8, lines 10-35) in order to reduce excessive requantization error in the recompressed data (Chen: column 8, lines 45-53) which would occur in Nostratinia's disclosure of using recursive quantization (Nostratinia: page 564, section 3, lines 20-29). Accordingly, given this teaching it would have been obvious for one of ordinary skill in the art to incorporate the Chen teaching of applying band or phase shifting methods into the Nostratinia method wherein said method is implemented on a computer readable medium including software code in order to reduce excessive requantization error in the primary reference's recursive quantization. The Nostratinia method, now incorporating Chen's application of band or phase shifting methods wherein said method is implemented on a computer readable medium including software code, has all of the features of claim 12.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chiang discloses an apparatus and method of optimizing the rate control in a coding system.
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (703)-305-4813. The examiner can normally be reached on Monday-Friday 8 hours.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris S. Kelley can be reached on (703)-305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andy S. Rao
Primary Examiner
Art Unit 2613

ANDY RAO
PRIMARY EXAMINER



asr
July 21, 2004